

REMARKS

Claims 1-26 were originally pending in the application. Claims 5-9, 13, 18-22, 26, 35-38 and 40-51 are now pending. Claims 5-8, 13, 18-21, 36 and 38 have been amended herein. Claims 1-4, 10-12, 14-17, 23-25, 27-34 and 39 have been cancelled previously or herein. Claims 40-51 have been added herein. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

PRIOR ART REJECTIONS

Claims 1, 5-7, 10-14, 18-20, 23, 25, 26 and 35-39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawa (U.S. Pat. No. 5,228,190) in view of Massee (US Patent No. 4,565,081). Claims 8, 9, 21 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sawa in combination with Massee and further in view of Persson (U.S. Patent No. 6,694,793). These rejections are respectfully traversed.

The Examiner states, in part, that Sawa discloses a forming and joining assembly [1] that includes a robotic arm [2] and a forming steel assembly [3] operatively associated with the robotic arm which forms a short flange on the first sheet material by bending the short flange onto the second sheet material. The Examiner notes that Sawa does not disclose using positional pressure control, instead relying on Massee to as teaching a roller forming tool which is pressed by a memorized position/pressure control. See Office Action, p. 2.

In making the above-rejections, it would appear that the Examiner misapprehends certain aspects of the limitations recited in claims. The term "short flange" as used in the art refers to the flange formed in areas where there is a tight corner, a cut line or surface curvature. *See* U.S. Patent No. 7,241,073, col. 2, lines 34-38. A short flange is also known in the art as a "corner flange." If short flanges are not used in these areas, the flange will split due to stretching or the flange will wad and fold onto itself due to compression in either the edge or the flange results in a poorly formed hem during the bending operation. *See Id.*

The hemming operation illustrated and described in Sawa is for a standard flange along an extended length of the body panel, and cannot be successfully used to crash form a short flange. The roller hemming apparatus 1 described in Sawa would only be capable of forming a short flange by performing multiple rolling passes or nudges to push the flange over. As noted in the background of the present application this operation is undesirable because it takes an excessive amount of time and does not form short flanges with the desired quality and repeatability. *See*, Application, ¶[0005]. Crash forming is not possible with the roller since it is not rigidly fixed at the end of the robotic arm.

Neither Sawa nor Massee discloses a forming steel or a forming steel assembly as recited in the claims. Both Sawa and Masse describes the use of a roller for forming the flange, not a forming steel. Moreover, neither Sawa nor Massee describe a tool steel having a wedge-shaped face that generally conforms to the short flange as recited in the claims. The hem roller support 3 described in Sawa is not a forming steel as the Examiner suggests, and would not be used to form a flange. Like the fork-shaped

holder 5 in Massee, the hem roller support 3 carries a shaft that rotatably supports the roller 4. See, Sawa '190, col. 4, lines 27-30; Massee '081, col. 38-41. In addition, the hem roller support does not generally conform to the short flange and does not have a wedge-shaped face.

At best, hem roller support 3 in Sawa (and fork-shaped holder 5 in Massee) corresponds to the hub 52 (or cylinder 156 in FIG. 6) in the present application which supports a roller 60, 162. In contrast, the forming steels 70, 70', 70" (or 168, 168' in FIG. 6) of the forming assembly 50 (or 150 of FIG. 6) described in the present application extend from the hub 52 (or cylinder 156 in FIG. 6) for engaging and crash forming the short flange. See, Application, ¶¶[0027], [0032] and [0035]. The forming steels 70, 70', 70" (or 168, 168' in FIG. 6) function like a hammer with the force being generated by the momentum of tool steel driven by the robot arm to crash into the short flange. The tool steel is distinct from the roller and its support, and perform a different type of forming function. Claims 45 and 51 provide further support for this difference as they recite both a tool steel and a roller.

Claims 5, 18, 41-45 and 47-51 define the claimed subject matter as including mechanical positioner which provides control and stability (in addition to that provided by the robotic arm) over the tool steel during the forming operation. While Massee may describe a roller forming tool which is pressed by a memorized position/pressure control as suggested by the Examiner, it fails to teach a roller forming tool which functions as a mechanical positioner or positional pressure unit to stabilize the robot arm and the forming steel. As noted above, the mechanical controller recited in claims 45 and 51 includes a roller on the forming assembly which engages a guide surface extending

from the nest to preload the positional pressure unit for removing backlash or slack from the system. To this end, the positional pressure unit prevents deflection of the forming steel during the crash forming operation. See Application, ¶¶[0034], [0035].

For the foregoing reasons, Applicant submits that the prior art of record does not teach or suggest the subject matter recited in the pending claims. Accordingly, Applicant respectfully request that the Examiner reconsider and withdraw the rejection based on Section 103 and pass this application to allowance.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By: _____

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